

VIA FACSIMILE & EMAIL

December 1, 2004

Mr. John Robertus, Executive Officer
California Regional Water Quality Control Board – San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Re: Comments of the California Avocado Commission on Draft Basin Plan Amendment and
Technical Report for Total Nitrogen and Total Phosphorus Total Maximum Daily Loads
for Rainbow Creek

Dear Mr. Robertus:

The California Avocado Commission (Commission) appreciates the opportunity to comment on the San Diego Regional Water Quality Control Board's (Board) Draft Rainbow Creek Nutrient TMDL issued on October 15, 2004. The TMDL is of great interest to the Commission because approximately a significant number of avocado growers are located in the Rainbow Creek watershed.

As proposed, the draft TMDL represents a significant change in the Board's approach toward the regulation of water discharges associated with irrigated agriculture. The Commission understands the Board's role in protecting water quality and the need for certain regulatory requirements to carry out this function. At the same time, water quality is affected by diverse activities with differing impacts on current water quality conditions. The Board's challenge is to achieve a level of regulatory oversight that is commensurate with a known water quality problem, while placing the obligation to identify and mitigate the loading of contaminants on those directly responsible for degradation of the watershed.

Our analysis of the draft TMDL leads us to conclude that the allocation of nutrient loads to orchards (and avocado production in particular) is not founded on sound science. The Commission also believes that the Board has chosen the wrong way to address a problem that falls short of constituting a serious nuisance. This is untenable given that the potential capital cost an individual grower would have to bear to achieve compliance may be as high as \$57,000, not including maintenance costs.

Prior to the establishment of target nutrient levels for avocado growers, stream monitoring should occur to identify all sources contributing to the nutrient load. It is quite possible that such findings will reveal that avocado farms are not the primary contributors. A solution that focuses on the primary source of the nutrient load would ultimately be more cost effective, lessening the burden on avocado growers. It also appears that an alternative strategy of providing riparian cover in areas now affected by algal blooms may almost entirely solve the problem. These alternatives should be fully explored by the Board.

Again, thank you for the opportunity to provide input on this important document.

Sincerely,

A handwritten signature in black ink, appearing to read "Tom Bellamore", with a stylized, flowing script.

Tom Bellamore
Senior Vice President and Corporate Counsel

**COMMENTS
OF
THE CALIFORNIA AVOCADO COMMISSION
ON
SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD'S
DRAFT RAINBOW CREEK NUTRIENT TMDL
issued
OCTOBER 15, 2004**

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Submitted: December 1, 2004

NOTIFICATION HAS NOT BEEN EFFECTIVE AT REACHING AVOCADO GROWERS DIRECTLY AFFECTED BY THE BOARD'S ACTION

One of the most important obligations of government agencies is to ensure that those affected by their actions are appropriately notified so that they may have an opportunity to participate and provide meaningful input into the decision-making process. With regard to the Rainbow Creek TMDL, while it appears that the minimal legal and technical notice requirements were met by the San Diego Regional Water Quality Control Board (Board), few growers in the watershed have received actual notice of the Board's pending action. This concern was expressed by Mr. Eric Larson, Executive Director of the San Diego County Farm Bureau, in his comments before the Board on November 17, 2004.

Certainly, the Board has the ability to identify those individual growers in the Rainbow Creek area and provide direct notice of the pending TMDL action; the Commission and the Farm Bureau stand ready to assist in this regard. Additionally, the Board could issue a press release to local media to raise awareness of this issue, or conduct a workshop on the draft TMDL in the affected community. Unfortunately, these steps were not taken. Now, as Board action is imminent, growers directly affected by the TMDL are just now learning about it. Not only is this less than ideal, it is unfair, particularly when one considers the Board's estimate of the cost of compliance at \$57,000 per grove, not including annual maintenance.

The lack of effective notice has caused the Rainbow Creek TMDL to be considered in a vacuum devoid of stakeholder participation. This situation must be rectified prior to the Board's formal adoption of the TMDL.

LOAD ALLOCATIONS FOR THE ORCHARD CATEGORY ARE NOT SCIENTIFICALLY VALID

A recurring concern about the TMDL is the scientific validity of export coefficients used to determine nutrient loadings. The export coefficient is the critical value that drives the determination of the load allocations adopted in the final regulation. If these values are not accurate, the TMDL stands without a proper scientific foundation, rendering it unsupported and challengeable.

Section 11.3.3 of the TMDL purports that the export coefficient selected for the orchard land use category (among others) is appropriate (see page 101). This claim is unsubstantiated, however, as evident from the following statement in the TMDL:

“The Regional Board recognizes it is difficult to calculate nutrient loadings from non-point sources with precision and acknowledges that *the development of nutrient loads from NPS discharges is characterized by uncertainties*” (emphasis added).

The statement strongly suggests that the key numerical values on which the entire TMDL is premised are not reliable and, at best, represent an educated guess by the Board. This is further reinforced by the Board's statement that the purpose of the implementation plan is to establish a monitoring program that will eventually produce “...data to reduce uncertainty and fill data as time progresses.”

The principal support for use of the export coefficient for the orchard land use category is a document prepared by a group of authors, led by Dr. Walter Boynton, studying the Chesapeake Bay (*Maryland's Coastal Bays: An Assessment of Aquatic Ecosystems, Pollutant Loadings and Management Options* (1993), which was submitted to the Maryland Department of the Environment)(see draft TMDL Table 4-1, footnote #2). The Board appears to have relied on the study to establish the Annual Total Nitrogen and Phosphorus Loads for the Rainbow Creek watershed.

In preparing these comments, the Commission corresponded with Dr. Boynton who responded to several questions that we posed. A direct account of the written exchange follows:

Q. (Commission): My principal question is whether the coefficients that have been applied to Rainbow Creek are appropriately applied given the dramatic difference in weather conditions between Maryland and San Diego County and the crops themselves (in particular avocado groves)? It seems to me there would be a variety of conditions that would be site specific which would call into question the use of your report for this purpose. For example, would the coefficient be comparable for avocados? How would rainfall conditions or soil conditions compare and affect the coefficient?

A. (Dr. Boynton): I THINK IT BEST TO USE THE MOST LOCAL DATA AVAILABLE...I HAVE NO IDEA IF THE COEFFICIENTS WE USED ARE APPROPRIATE FOR AN AVOCADO GROVE

Q. (Commission): Since 1993 many conditions may have changed in orchard fertilizer practices. Would your study still be appropriate to base a coefficient on given these potential changes?

A. (Dr. Boynton): AGAIN, I DON'T KNOW...IF PRACTICES CHANGE PRESUMABLY THE YIELDS WOULD CHANGE BUT THERE MAY (OR MAY NOT) BE TIME DELAYS IN OUTPUTS FOLLOWING CHANGES IN PRACTICES.

Q. (Commission): Would your coefficient be affected by differing methods of fertilizer application? If practices currently in use for avocado production were different than that used in Maryland I would think that could have a dramatic effect on the coefficient value.

A. (Dr. Boynton): NOTE THAT THE YIELD COEFFICIENTS WE USED WERE NOT DEVELOPED BY US USING SOME LOCAL STUDIES. THEY WERE LITERATURE VALUSES [sic] THAT APPEARED TO BE APPROPRIATE. I CAN TELL YOU THAT THE RECENT RE-EVALUATION OF THE COASTAL BAYS NUTRIENT INPUTS INDICATED THAT THERE COEFFICIENTS YIELDED REASONABLE RESULTS. YOUR CONCERN ABOUT DIFFERENCES MAY WELL BE IMPORTANT

Q. (Commission): If the coefficients noted above are not appropriate, can you suggest a range of coefficient values that make sense in the San Diego area for these constituents?

A. (Dr. Boynton): NO...I'M NOT FAMILIAR WITH THE AREA...GET SOME LOCAL ADVISE [sic].

It is clear from Dr. Boynton's comments above that he has serious doubts about the applicability of the export coefficients identified in the study to local conditions in a completely different geographic area, here Rainbow Creek. There is no valid scientific basis, therefore, for the Board's use of 2.5 kg/ha/yr for Total Nitrogen and 0.2 kg/ha/yr for Total Phosphorus for the orchard land use category in the TMDL.

THE CONTRIBUTION OF LOADING FROM ATMOSPHERIC DEPOSITION IS UNDERESTIMATED

In the Source Assessment of the TMDL, the Board determined that atmospheric deposition of nutrients should be constrained to the creek surface area (see Section 4.0). By constraining the calculation to the creek area, the estimate of nutrient loading from atmospheric deposition is artificially low. The result is that an important source of nutrients which cannot be controlled is not considered in the total loading, thereby placing a disproportionate burden on other sources to reduce their contribution by an even greater amount to achieve target water quality values. The Board's estimates from atmospheric deposition are 40 kg N/yr and 0.6 kg P/yr (see sections 4.1.3 and 4.2.3, respectively). The stated basis for this determination is:

“Atmospheric deposition is calculated using water surface area only, since total nitrogen loads to Rainbow Creek were estimated using atmospheric deposition rates” (Section 4.1.3).

A 2001 report published in *Landscape Ecology*, “Predicting Nutrient And Sediment Loadings To Streams From Landscape Metrics: A Multiple Watershed Study From The United States Mid-Atlantic Region,” however, suggests that using landscape metrics, e.g., export coefficients based on land use, results in the under-reporting of the contribution from atmospheric deposition. The report found:

“However, atmospheric nitrate also consistently explained a relatively high percentage of nitrogen in streams. This suggests that for at least portions of the eastern United States one must understand patterns of atmospheric nitrogen deposition in order to determine potential loadings to streams – *landscape metrics generated from surface characteristics will under-predict the loadings*”(emphasis added).

Remarkably, the draft TMDL omits any discussion of those reports in the scientific literature that speak to the significance of atmospheric deposition and whether land use export coefficients adequately address the calculation of loadings. Moreover, there is no mention in the TMDL about how the conclusion in the *Landscape Ecology* report (i.e. landscape metrics under-predict loadings) for the eastern United States should be interpreted in the western United States. It is our concern that a potentially significant source—one beyond the control of any entity within the Rainbow Creek watershed—could possibly explain a significant portion of the nutrient loading in Rainbow Creek.

THE ALLOCATION OF NUTRIENT LOADINGS TO THE ORCHARD CATEGORY DOES NOT DIFFERENTIATE BETWEEN TYPES OF CROPS

As proposed, the TMDL combines various tree fruit crops in one category, despite the fact that growers employ differing approaches to apply nutrients to each crop. There is no specific export coefficient value for avocados. Avocado nutrient load allocations should be based on specific information that takes into account grower practices and resulting contributions to the TMDL. Otherwise, avocado growers are unfairly burdened with an allocation that is excessive or beyond their ability to control.

THE TMDL IS NOT FOUNDED ON A PERVASIVE WATER QUALITY IMPAIRMENT

Dr. David Jenkins is the sole scientific peer reviewer of the revised TMDL. In his review he was asked to respond to the following question: Does the staff report adequately and correctly address the effects of nutrients in a freshwater stream system? His response:

“Yes, in general, but you have not really made a very strong case relating the current N and P levels to any conditions that impair water quality and adversely affect any beneficial use except municipal water supply.”

With this comment, Dr. Jenkins has noticed the elephant in the room, i.e. that the TMDL would cause growers and the County of San Diego to spend tens of millions of dollars to address a problem that does not rise to the level of concern justifying such an enormous expenditure.

The San Diego Region’s Basin Plan establishes the nature of the problem:

“Algal blooms depress the dissolved oxygen content of water and can result in fish kills. Algal blooms can also lead to problems with taste, odors, color, and increased turbidity. Floating algal scum and algal mats are also an aesthetically unpleasant nuisance” (see pages 3-6).

Prior to 2002, the Board did not have specific numerical standards that defined conditions in a stream that promoted algal impairments. As a result, the Board was unable to develop a scientifically-supportable impairment on which to base a TMDL. A recent revision to the Basin Plan, however, added numerical reference points against which total phosphorus and (based on the application of a ratio) total nitrogen levels would be gauged, to determine if water quality objectives were exceeded for purposes of enforcement. Now, with the derived impairments exceeding the water quality numerical objectives, the Board finds an obligation to develop the TMDL. Indeed, the establishment of the numerical values for total phosphorus and total nitrogen (via the use of a derived ratio) provide the vehicle for enforcing water quality objectives, whether or not any nuisance condition related to the presence of algae exists at all. The Board states quite clearly in the Basin Plan:

“...waters shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growths cause nuisance or adversely affect beneficial uses.”

Yet, with this statement, which serves to create a pre-condition for the application of any other standard, the Basin Plan goes on to create numerical water quality objectives that establish a contradictory standard.

It is quite clear that conditions exist in Rainbow Creek where the values of total phosphorus and the ratio of nitrogen and phosphorus do not affect beneficial uses or give rise to an algal nuisance. In such cases, the language of the Basin Plan cited above should be controlling since the basis on which the numerical values are established is premised on the existence of nuisance conditions or conditions that adversely affect beneficial uses. In other words, in the absence of a verified condition of nuisance or a demonstrable adverse effect on beneficial uses, the numerical values should not drive a listing for purposes of a finding of impairment.

RECENT NUTRIENT REDUCTIONS IN RAINBOW CREEK CLEARLY SHOW THE SUCCESS OF A VOLUNTARY NUTRIENT REDUCTION PROGRAM

For much of the 1970s, nitrate levels for Rainbow Creek were under 10 mg/l reaching an average high of 8.78 mg/l in 1977. Maximum recorded values during that time reached the mid-20 mg/l range. In the early 1980s, nitrate levels showed a sudden and dramatic increase, at times exceeding 300 mg/l. These levels led to the 1996 listing of Rainbow Creek as an impaired watershed due to eutrophication.

In response, the Mission Resource Conservation District (MRCD), in cooperation with Marine Corps Base Camp Pendleton, conducted an investigation of sources of nitrate and initiated a voluntary program with homeowners and nurseries to reduce nitrate levels. The program was an amazing success by any measure. Levels of nitrates that previously exceeded 200 mg/l on average were lowered to an average 7.7 mg/l by 1998-99. This represents a reduction of 96% in nitrate levels; a full account of these events is provided in the TMDL (see Section 2.3, page 12).

The significance of the MRCD program should not be missed. This voluntary program returned levels of nitrate to that pre-existing in the watershed during the 1970s and highlights the value of local voluntary efforts to control pollutants. By any measure, this level of pollutant reduction should be considered a major victory and highlights the direction that the Regional Board should pursue in seeking further reductions by embracing the pre-eminent principle of the State's Non-Point Source Plan which emphasizes the value and priority of voluntary efforts.

THE EXISTENCE OF ALGAL BLOOMS IN RAINBOW CREEK IS CLOSELY ASSOCIATED WITH SUNLIGHT, WHICH SUGGESTS A DRAMATIC, COST EFFECTIVE, ALTERNATIVE MANAGEMENT PRACTICE TO PROTECT BENEFICIAL USES

It is reasonably well established that the presence of algal blooms is closely related to surface water's exposure to sunlight, especially where water ponds have formed. The TMDL cites only a few areas in the Rainbow Creek watershed where algal blooms occur. It states:

“...field investigations by Regional Board staff in July 1999, at the end of the MRCD monitoring period, identified two areas in the lower reaches (downstream of Willow Glen-4) affected by excessive algal growth” (see Section 2.3, page 12).

It goes on to state:

“In 2000, these two locations, as well as the Oak Crest and Willow-Glen-4 monitoring stations, were determined to be affected by excessive algae growth. The Riverhouse station also exhibited excess emergent plant growth” (see Section 2.4, page 17).

Photographic evidence of algae growth at these specific locations is provided in Appendix C of the TMDL. Interestingly, according to the TMDL:

“There was at most limited or no riparian canopy at the sampled locations, allowing for maximum light availability and water temperature increase. A dense canopy of vegetation exists along much of Rainbow Creek. *The canopy can limit availability of sunlight to aquatic plants, effectively limiting their development. Consequently, despite the presence of elevated nutrient concentrations, excessive quantities of green algae have not been observed to the same degree in the shady areas of Rainbow Creek*” (emphasis added).

Certainly, elevated levels of nutrients in water can promote excessive algal growth, but other factors, such as light availability and temperature, also play a critical role. This suggests a new approach to the TMDL Implementation Plan that the Board should consider.

In areas where Rainbow Creek is open to sunlight, re-vegetation efforts should be made. Development of a new, vegetative canopy would retard algal growth, the driving force behind the establishment of the numeric water quality objectives in the TMDL. As noted above, without the presence of an algal bloom the development of a numerical objective for nutrient levels is unjustified. Requiring extensive upstream controls at great cost to growers in order to resolve a limited and site specific problem is simply not warranted. A site specific response should first be pursued.

THE CONDITION OF RAINBOW CREEK APPEARS TO BE IMPROVING AND THE LINK BETWEEN POOR AQUATIC AND BENTHIC LIFE CONDITIONS AND NUTRIENT LEVELS IS TENUOUS

After a review of the beneficial uses of Rainbow Creek, the TMDL concludes that elevated levels of nutrients have led to conditions that negatively affect such uses (see Section 2.6). The language of Section 2.6 of the TMDL suggests, however, that the conditions ascribed to nutrient loadings may not be the causative factors leading to degraded water quality. Indeed, the TMDL includes a discussion of how algal blooms create offensive odors and other nuisance conditions yet it is unable to definitively relate these conditions to nutrient concentrations.

No fish kills have been attributed to Rainbow Creek despite the concern expressed over observations of localized low dissolved oxygen concentrations, although some areas were uninhabitable to fish for limited periods of time. According to the TMDL:

“At the time of the 1997 monitoring, *DO concentrations were not low enough to cause adverse effects on aquatic life*” (emphasis added).

Similarly, no conditions of odor were cited in the TMDL.

Conditions adversely affecting amphibians are cited in the TMDL as being “highly probable,” yet the species mentioned were not those specifically present in the creek.

Rainbow Creek is cited as having an “impaired insect population.” While nutrients are identified as a potential cause of this “impairment,” the TMDL document lists other potential factors, including sedimentation, scouring, and chemical and organic pollution, which could alone or in combination could affect insect populations. It is inappropriate to suggest that nutrients have caused the “impairment” when no evidence is provided in support of the assertion and when other causes are likely. Also, the use of the term “impairment” to describe the insect community suggests that there is a formal listing for impairment of insects, which is inaccurate and misleading.

The TMDL also cites a condition of low species diversity as supportive of a degraded ecosystem. There is not mention of a causative factor for this condition, however. Additionally, recent information cited in the TMDL suggests a mixed picture and improvement:

“The creek was “average” in both the September 1998 and November 1998 monitoring events, showing improved species diversity and a more well-distributed community structure with four of five functional feeding groups represented, although it continued to show an absence of sensitive species.”

This suggests that the reductions in nutrients resulting from the Mission Resource Conservation District's voluntary program are yielding ecological dividends.

THE RAINBOW CREEK TMDL DOES NOT PROVIDE AN ALLOWANCE FOR SEASONALITY DESPITE CLEAR INDICATIONS THAT THE EFFECTS OF NUTRIENT CONCENTRATIONS IN SURFACE WATER ARE HIGHLY DEPENDENT ON SEASONAL FACTORS

Actions required by the TMDL remain constant despite clear evidence that the presence of excessive amounts of algae is highly dependent on seasonal conditions. The TMDL states:

“Winter is the least critical time of year for algal growth because its growth is limited as a result of cooler temperatures, less available light, and generally higher flows. Field surveys performed in December 1999 and January 2000 did not find algae in excessive quantities” (see Section 7.0).

The rationale offered for a year-long standard is weak. As discussed above, the numerical water quality objectives for total nitrogen and total phosphorus are founded on the premise that they are needed to prevent excessive algal growth and concomitant nuisance conditions (see pages 21 through 23 of the TMDL). Although algal growth was observed on Rainbow Creek, it is important to note that eutrophication was not:

“While the creek does have several areas susceptible to excessive algal growth during the spring, summer and fall, eutrophic conditions were not observed during the monitoring period.”

The TMDL draws a clear link between existing levels of total nitrogen and total phosphorus (biostimulatory substances) in surface waters and algal growth. Without the latter, the Board lacks justification for the TMDL. Yet the evidence from recent water quality sampling, on which the TMDL is based, fails to make a convincing case that the numerical levels actually result in algal blooms that constitute a “nuisance” or “adversely affect beneficial uses” (see pages 21-23). To the contrary, statements within the TMDL clearly indicate the absence of nuisance conditions or adverse impacts on beneficial uses linked to the presence of excessive algae.

If algae, at the peak of its growth, does not create a nuisance or affect beneficial uses (thereby calling into question the validity of the entire TMDL), then rejection of a seasonal nutrient differential is even more unfathomable.

It is also known that nutrients released during wet weather conditions have a dramatically different biostimulatory effect than during other periods. The nutrient loading at certain periods of the year is not clearly defined in the TMDL. It may be that the nutrient load during wet weather is relatively greater than during dry weather, but has a far less significant effect. Since the TMDL does not provide for any seasonal variation, however, it is likely that the numerical nutrient values, if exceeded during wet weather, would have no appreciable effect on algal blooms which are absent during the winter period due to depressed temperature and higher stream flows.

Finally, the conclusory statement in the TMDL that sediments act as a sink for nutrients is not supported by any specific reference (see section 7.0, page 50).

THE IDENTIFIED IMPAIRMENT OF RAINBOW CREEK IS MINIMAL COMPARED TO THE COST ASSOCIATED WITH TMDL IMPLEMENTATION

Compliance with the TMDL is estimated to cost from a low of \$18,565,000 to a high estimate of \$41,772,000 not including costs associated with individual agricultural operations. Assuming a high cost of \$57,705 for each orchard, avocado production in the Rainbow Creek watershed could be rendered economically infeasible.

The Rainbow Creek TMDL provides very little evidence of actual documented impairments other than the presence of excessive algae in some limited areas. Of course, the modification of the Basin Plan to include numerical objectives for total phosphorus and a calculated ratio for N:P provides the principal basis for the TMDL. These values must be interpreted in the context of how they result in nuisance conditions or affect beneficial uses. As noted above, the evidence of impact provided in the TMDL is profoundly weak.

In the view of the Commission, the ultimate question for the Board to consider is: “To what degree does an admittedly limited and seasonal condition of excessive algae in localized areas, which has not been shown to have any significant adverse effects, mandate the expenditure of tens of millions of dollars and the potential dissolution of a segment of the agricultural community to remedy?”